696-250

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:

John Brewer et al.

Serial No.:	09/493,350	Group Art Unit:	1764
Filed :	January 28, 2000	Examiner :	H. Tran

For : MULTI-ZONE CRACKING FURNACE

New York, NY 10036
May 2, 2005

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

BRIEF ON APPEAL

Sir:

Applicants submit the present brief, in triplicate, in support of the appeal in the above captioned application from a final rejection dated November 3, 2004, and a Notice of Appeal filed on February 3, 2005. Reversal of the Examiner's rejections respectfully is requested based on the following arguments. The required fee of $500.00 is submitted herewith in the form of a check.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to:

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

on May 2, 2005

Alan B. Clement, Reg. No. 34,563

05/05/2005 MAHMED1 00000070 09493350
01 FC:1402 500.00 OP

I. REAL PARTY IN INTEREST

The invention of the present application is the property of Stone and Webster Engineering Corporation the real party in interest, through assignment from the inventors.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences known to appellant or its legal representatives.

III. STATUS OF CLAIMS

Claims 1-12 are the only claim pending in the present application. The rejection of these claims is appealed herein.

IV. STATUS OF AMENDMENTS

There are no amendments which have not been entered in the present application.

V. SUMMARY OF INVENTION

The present invention as amended herein is directed to a single furnace that cracks at least two separate and independent hydrocarbon feedstocks into different olefinic products, having at least one fired radiant chamber that is divided into at least two separate independent radiant zones by a dividing means. The separate and independent radiant zones are provided with separate and independent feed tubes (not from a common manifold) and with separate and independent temperature control. The present claimed invention thereby provides a single furnace that cracks more than one different feedstocks under different reaction conditions at the same time to produce an entirely different olefin product slates.

V. ISSUES

The issues on appeal are whether Claims 1-5, 8-10 and 12 as amended are unpatentable under 35 U.S.C. 102 (b) as being anticipated by or, in the alternative under 35 U.S.C 103(a) as obvious, to Thompson U.S. 2,323,498 (hereinafter "Thompson"), and whether Claims 6-7 and 11-12 are unpatentable under 35 U.S.C. § 103(a) over Thompson in view of United States Patent No. 6,159,001 or 5,711,661 to Kushch et al.

VI. GROUPING OF CLAIMS

Claims 1, 3 and 5-8 of the present application stand and fall together.

Claim 2 and 4 of the present application stand and fall together.

Claims 9-12 of the present invention stand and fall together.

VII. ARGUMENT

The present invention as amended herein is directed to a single furnace that cracks at least two separate and independent hydrocarbon feedstocks into different olefinic products, having at least one fired radiant chamber that is divided into at least two separate independent radiant zones by a dividing means. The separate and independent radiant zones are provided with separate and independent feed tubes (not from a common manifold) and with separate and independent temperature control. The present claimed invention thereby provides a single furnace that cracks more than one different feedstocks under different reaction conditions at the same time to produce an entirely different olefin product slates. Applicants respectfully submit that the claimed invention is novel and unobvious over the applied art.

Applicants acknowledge that Thompson describes a center wall up-draft heater with a combination radiation and convection furnace for heating a stream of fluid, either in liquid, vapor or mixed phases. However, Thompson teaches a furnace with an arrangement of fluid conduits in separate combustion zones connected to each other by ***communal inlet and outlet manifolds***. In this regard, the process coils of Thompson comprise "a plurality of substantially parallel U shaped conduits 9 and 9'... which

communicate ... with a plurality of substantially vertical, parallel conduits 10 and 10'" to form one continuously connected fluid conduit that is incapable of cracking two separate and independent feedstocks at the same time. *See* Thompson at col. 2, lines 45-50, and Fig. 1. Moreover, Thompson discloses separate inlet and outlet manifolds 11 and 12 within the separate combustion zones that share individual fluid conduits (i.e. 9, 9', 10 and 10', respectively) to form a mutual and continuous series of process coils. Such a configuration simply cannot separately process more than one feedstock at a time because the coils are all connected to reciprocal manifolds. The present claimed invention specifically requires the cracking of separate and independent feedstocks in separate radiant chambers to produce separate and independent product slates, which is not disclosed, taught or suggested by the common manifold configuration shown in Thompson.

Specifically, Applicants respectfully disagree with the Examiner's contention that Thompson can be construed to teach or suggest and "independent process coil" for each zone capable of processing more than one feedstock at a time, as there is no suggestion of such an expedient anywhere in Thompson. In fact, Thompson's teaching of common inlet and outlet manifolds teaches away from the present claimed invention.

The Thompson reference simply does not expressly or implicitly provide for separate and independent feed lines to the process coils, nor for the cracking of more than one feedstock at a time. Further, Thompson does not disclose, suggest or motivate one skilled in the art to provide for an effective and efficient method for cracking more than one separate and independent feedstock at a time.

Instead, Thompson describes a simple furnace capable of heating only one fluid stream that passes through a ***common manifold*** into a series of conduits that is shared by the separate radiant zones. In fact, Thompson teaches away from the presently claimed invention by only disclosing process coils that are communally connected to one another. See Thompson at Figures 1-5. As such, Thompson teaches "process coils" that are incapable of processing separate and independent feedstocks without mixing the feeds together as called for in the present claimed invention. Although Thompson provides for separate radiant zones there is no motivation or suggestion for independent feedstock to

enter and exit the furnace without being exposed to the communal manifolds and continuously connected conduits that make up the "process coils."

Moreover, Applicants claim error in that the Examiner's rejection failed to identify in Thompson where each and every element of claims 1-12 are shown. Specifically, the Examiner failed to identify where in Thompson there is a specific disclosure of the required furnace having, among other things, at least two separate and independent feedstock for each separate and independent process coil for cracking the separate and independent feedstocks to olefin before exiting the furnace.

The Examiner suggests that Thompson teaches and "independent coil for each zone." Applicants respectfully submit that this suggestion is erroneous because the coil denoted as an "independent coil" by the Examiner is not an independent coil at all, but instead is a continuous series of conduits connected to ***commonly shared inlet and outlet manifolds.*** *See* Thompson at col. 2, lines 45-50, and Fig. 1, 4 and 5. Such a configuration simply cannot ***independently and separately*** process more than one feedstock at a time because the coils are all continuously connected to the mutually shared manifolds. Thompson thereby effectively eliminates the users' ability to crack various different feeds under various conditions to produce different olefinic product slates because the "process coils" must contain the same feedstock fed from the communally connected manifolds.

Thus, in sharp contrast to the express recitations of the presently claimed invention, the "process coils" and "manifolds" of the Thompson furnace necessarily contain the same feedstock and share the conditions of both radiant chambers. Thus, ***separate and independent*** cracking for various different independent feedstocks at various conditions as required by the present claims is not disclosed or suggested by Thompson and, in fact, cannot be achieved by Thompson.

In item 6 of the Office Action, the Examiner rejected Claims 2, 4, 8 and 12 under the provisions of 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 2,323,498 to Thompson.

With regard to independent claim 2 and dependent claim 4, Applicants respectfully submit that there is absolutely no disclosure in the Thompson reference that

suggests the claimed features, which require at least four separate and independent hydrocarbon feeds are used to produce olefins by providing a separate and independent process coil for directing a separate and independent hydrocarbon feedstock that enters and exits the furnace through each said separate and independent radiant cracking zone, and separately and independently controlling the temperature in each of said separate and independent radiant cracking zone to crack each said separate and independent hydrocarbon feedstock to olefins. There is no suggestion or motivation in the teachings of Thompson regarding the cracking of more than one common feedstock, let alone the four independent and separate feedstocks called for in Claims 2 and 4.

In the Office Action, the Examiner rejected Claims 6-7 and 11-12 under 35 U.S.C. § 103(a) as being unpatentable over Thompson '498 in view of Kushch et al. ('001 or '661). Because the Examiner merely relies on the Kushch et al. references to teach the use of Nextel material in furnaces, Applicants respectfully submit that for the reasons presented above, Claims 6-7 and 11-12 are patentable over the applied art.

In the Response to Arguments section of the Office Action, the Examiner suggests that Fig. 1 of Thompson discloses an alternative embodiment that discloses the claimed separate and independent process coil for each said separate independent radiant zone for cracking each said separate and independent feedstock. However, it is unclear in the Examiner's response how Thompson's "[an]other embodiment in Fig. 1" that depicts "process coil 10 is disposed in zone 7 and process coil 10' is disposed in zone 7', wherein each coil 10, 10' has an extension 9, 9', respectively, the coils 10, 9 extend through at least a portion of the convection chamber 8 and into said zone 7, 7' before exiting said furnace," remotely suggests or teaches the claimed required "separate and independent feedstock" that enter and exit the furnace independent of one another. The Examiner's analysis of "separate and independent feedstock" fails because the process coils 10, 9 and 10', 9' are both feed by a ***communal inlet manifold*** that simply cannot separately process more than one feedstock at a time because all the "process coils" are fed with the same feedstock from the common manifold.

Further in this regard, the Examiner suggested the intended use of cracking two separate and independent feeds is of no patentable weight because the instant claims are

directed to an apparatus and "also the phrase of process more than one feed stock 'at a time' is not recited." Applicants respectfully disagree with the Examiner because instant Claim 1, subsection (d) clearly and unequivocally states:

> a separate and independent process coil for each said separate independent radiant zone for cracking each said separate and independent feedstock, wherein each said separate and independent process coil extends through at least a portion of said convection chamber and extends into one of said separate and independent radiant zones for separately and independently cracking said separate and independent feedstocks to olefins before exiting said furnace;

The presently claimed furnace is for separate and independent process coils in separate and independent radiant zones for cracking a separate and independent feedstock to olefins before exiting the furnace. Simply stated, Thompson's reciprocal inlet manifold that is exposed to the various conditions of each radiant chamber is precluded from cracking more than one "separate and independent" feedstock at a time.

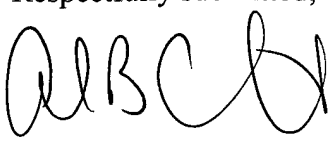
Further, with regard to claims 9-12, these claims are written in Jepson format as a furnace that is improved over a conventional furnace, wherein the improvement derives from providing a wall in the furnace and providing separate and independent process coils to the furnace. Because Thompson teaches only process coils that are dependent from a common manifold (not independent and separate), Thompson cannot be construed to disclose, teach or suggest the present improved furnace as called for in Claims 9-12.

In view of the foregoing discussion, Applicants respectfully submit that the pending claims are allowable over the cited prior art. Allowance of the claims therefore respectfully is solicited.

VIII. CONCLUSION

Based on the above, Applicants respectfully submit that the pending claims are patentable over the cited prior art and that the rejections of the Examiner properly are reversed. Favorable action is respectfully requested and earnestly solicited.

Respectfully submitted,



Alan B. Clement
Reg. No. 34,563

MAILING ADDRESS

Hedman & Costigan, P.C.
1185 Avenue of the Americas
New York, NY 10036
212-302-8989

IX. APPENDIX

1. A furnace for cracking at least two separate and independent hydrocarbon feeds to produce olefins, said furnace comprising:

   (a) at least one fired radiant chamber, wherein said radiant chamber is divided into at least two separate independent radiant zones by a fired radiant chamber dividing means;

   (b) at least one radiant burner in each said separate independent radiant zone of said fired radiant chamber;

   (c) a convection chamber in direct communication with each said fired radiant chamber;

   (d) a separate and independent process coil for each said separate independent radiant zone for cracking each said separate and independent feedstock, wherein each said separate and independent process coil extends through at least a portion of said convection chamber and extends into one of said separate and independent radiant zones for separately and independently cracking said separate and independent feedstocks to olefins before exiting said furnace;

   (e) a flue for discharging flue gas located at the top of said convection chamber of said furnace; and

   (f) a means for independently controlling the radiant burner in each said separate independent radiant zone.

2. A furnace for cracking at least four separate and independent hydrocarbon feeds to produce olefins, said furnace comprising:

(a) at least two fired radiant chambers, wherein each said radiant chamber is divided into at least two separate independent radiant zones by a fired radiant chamber dividing means;

(b) at least one radiant burner in each of said separate and independent radiant zones of said fired radiant chambers;

(c) a convection chamber in direct communication with each said fired radiant chamber;

(d) a separate and independent process coil for each said separate independent radiant zone, wherein each said process coil extends through at least a portion of said convection chamber and extends into one of said separate and independent radiant zones for separately and independently cracking said separate and independent feedstock to olefins before exiting said furnace;

(e) a flue for discharging flue gas located at the top of each said convection chamber of said furnace; and

(f) a means for independently controlling the radiant burner in each said separate independent radiant zone.

3. A furnace as defined in Claim 1 wherein said fired radiant chamber is divided into two separate independent radiant zones having substantially the same area.

4. A furnace as defined in Claim 1 wherein said fired radiant chamber is divided into two separate independent radiant zones which have substantially different area.

5. A furnace as defined in Claim 1 wherein said fired radiant chamber dividing means is a brick wall.

6. A furnace as defined in Claim 1 wherein said fired radiant chamber dividing means is a curtain of Nextel material.

7. A furnace as defined in Claim 1 wherein said fired radiant chamber means is a combination of a curtain of Nextel material and ceramic fiber wall.

8. A furnace as defined in Claim 1 wherein said means for independently controlling the radiant burners in each said separate independent radiant zone comprises a means for controlling the temperature of each said separate independent radiant zone independently.

9. An improved pyrolysis cracking furnace having a radiant cracking chamber wherein said improvement comprises dividing said radiant cracking chamber into at least two separate and independent radiant cracking zones by providing a dividing wall in said radiant cracking chamber to separate said radiant cracking chamber into at least two separate and independent radiant cracking zones, providing a separate and independent process coil for directing a separate and independent hydrocarbon feedstock through each said separate and independent radiant cracking zone, and separately and independently controlling the temperature in each of said separate and independent radiant cracking

zone to crack each said separate and independent hydrocarbon feedstock to olefins.

10. An improved furnace as defined in Claim 9 wherein said fired radiant chamber dividing means is a brick wall.

11. A furnace as defined in Claim 9 wherein said fired radiant chamber dividing means is a curtain of Nextel material.

12. A furnace as defined in Claim 9 wherein said fired radiant chamber dividing means is a combination of a curtain of Nextel material and ceramic fiber wall.